CODE:3838 SEM-IV EXAMINATION - MARCH/~~2015~~ SET-B

M-403: NUMERICAL ANALYSIS

TIME: 2:30 Hours TOTAL MARKS:70

INSTRUCTIONS: (1) All questions are compulsory.
(2) Each question carries equal marks.

Q.1 A Derive differential formula based on Newton's backward formula [07]

B Find y'(0.45) and y''(0.45) from the following table. [07]

X	0.35	0.40	0.45	0.50	0.55
Y	1.521	1.506	1.488	1.467	1.444

OR

Q.1 A Derive differential formula based on Sterling's formula [07]

B Find the 1st 2nd and 3rd derivatives of f(x) at x = 2.5 using Newton's forward formula [07]

X	2.5	3.0	3.5	4.0	4.5	5.0
f(x)	3.375	7.000	13.625	24.000	38.875	59.000

Q.2 A Derive Simpson's $\frac{1}{3}^{rd}$ rule [07]

B Evaluate $\int_0^1 \frac{1}{1+x^3} dx$ using Trapezoidal rule by taking 7 co-ordinates. [07]

OR

Q.2 A Derive General quadrature formula [07]

B Evaluate integration $\int_0^{\frac{\pi}{2}} \cos\theta \, d\theta$ by waddle's rule by dividing into 6 equal sub-parts. [07]

Q.3 A Derive :- $Q_{33}(0)$ [07]

B Discuss symbol for integration formula [07]

OR

Q.3 A Discuss Newton's cotes formula. [07]

B Prove that ; $Q_{31}(1)= \frac{h}{24}(-1, 13, 13, -1)$ [07]

Q.4 A Discuss: Bisection method. [07]

B Solve the equation f(x): x^2- 6x +1=0 by Newton-Raphson formula correct to three decimal places. [07]

OR

Q.4 A Derive Method of false position ,derive the formula for finding p^{th} root of positive number N. [07]

B Find the real root of the equation f(x): x e^x-1 = 0 correct to three decimal places. Using method of successive approximation. [07]

Q.5 A Derive Taylor's series method [07]

B Using Euler's method , solve $\frac{dy}{dx} = y + 2x^2$, y(0) =1 , compute y(0.1) and y(0.2)whenever h = 0.1. [07]

OR

Q.5 A Given the differential equation for Runge-Kutta 4th order $\frac{dy}{dx} = \frac{y+x}{y-x}$ with y(0) =1 ,find y(0.2) whenever h = 0.1. [07]

B Discuss modified Euler's method. [07]